

Off-Grid Energy

INVESTMENT SUMMARY





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Overview: USADF currently manages a portfolio of **28 projects** in **6 countries** under the Power Africa Off-Grid Energy Challenge. Total commitment is **\$2.8 million** following Rounds I and II.



Country	Grantee	Year	Value	Summary
ETHIOPIA	Ethio Resource Group	2014	\$100,000	Wind: Ethio Resource Group is an Ethiopian-owned and managed renewable energy research and consulting company established in 2005. Menz Gera Midir Woreda is in a rural highland area with very limited infrastructure access where the majority of the population is composed of subsistence farmers. Fewer than 200 out of approximately 22,000 households have electricity in their homes, and in the proposed project area, zero households or businesses have electricity access. Households spend as much as 30% of their annual incomes on the few energy services they can access, which include kerosene, dry cell batteries, and commercial mobile phone charging. The project proposes to address the current challenges (including limited hours of operation for schools, health clinics, businesses, and children's studying) by installing six 1 kW wind turbine systems to power six micro-grids, which will deliver power to 300 households, 20 enterprises and 1 health clinic. The installations will consist of six small wind electric generators and batteries for energy storage. Ethio Resource Group will own and manage the facility as a distributed energy service company, collecting monthly service fees from consumers in exchange for its services.
	Organization for Rehabilitation and Development in Amhara (ORDA)	2014	\$100,000	Biogas: ORDA is a Ethiopian not-for-profit NGO. Traditional wood burning stoves pose serious health risks to women and children that are chronically exposed to high levels of smoke and ash on a daily basis. The use of wood as a fuel source for cooking also creates a difficult time burden, primarily for women and girls who are the ones travelling to collect firewood for cooking fuel. Furthermore this creates an unsustainable demand for fuel that contributes to high levels of deforestation. The project creates renewable energy access for 420 off-grid rural households living in Alefa district of Amhara region by constructing 420 biogas plants for cookstove use. The project will provide training for 420 married-couple biogas users on the proper operation and maintenance of biogas systems, and will also build the capacity of user-cooperatives that will be established with the purpose of ensuring sustainable community project management.
	Sun Transfer Tech	2014	\$100,000	Solar: Sun Transfer Tech is an Ethiopian-owned private limited company focused on importing and distributing solar products. Ethiopia's population of an estimated 92 million people lives overwhelmingly in rural areas, where the electric grid reaches 5% or less of homes. In the project's target location in the Southern Nations, Nationalities and People's region, the rural population is totally un-electrified and far from the grid. This project addresses the problem by selling solar home systems to 325 rural households through an energy lending scheme, and empowering small solar entrepreneurs to sell, install, and provide after-sales service for the systems. Their systems range in size between 20, 50 and 100 watt systems and will power a variety of appliances including light bulbs, radios, mobile chargers and solar TVs.
GHANA	New Energy	2014	\$100,000	Solar: New Energy is a Ghanaian NGO with almost 20 years of experience providing basic social and rural infrastructure services for underserved communities across Ghana. In Nabogo access to basic water and electricity services is less than 30%. It is difficult to treat and transport water to the areas where it is needed as the majority of the country's rural population does not have grid access and when available, the grid electricity supply is unreliable. New Energy tackles this problem by utilizing solar-powered water pumping and purification technology to supply clean water to over 980 inhabitants of Nabogo. The project will be run as a social enterprise, in which a community-owned cooperative takes over the operation and management after sufficient training has been provided.

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	The Kumasi Institute of Tropical Agriculture (KITA)	2014	\$100,000	Biogas: KITA is a Ghanaian NGO which serves as a leading center for research, technology transfer and education in farming, agriculture, agribusiness, and environmental resources management. The community of Ohwimase is located in Bosome-Freho District of Ashanti Region and has a large local industry in the production of palm oil and palm kernel oil. The town has no grid access to electricity and as a result cannot use electrical machinery for processing of their agricultural products. They instead use traditional energy-inefficient systems for agricultural processes such as cracking and milling, which can take up to 30 hours and consume more than 40 hours of labor. As an alternative, residents travel several kilometers to the nearest town with available electricity. KITA is addressing the farmers' issues by procuring and installing a 20 kilowatt gasifier plant to convert the town's biomass and agricultural residue into electricity. In addition, KITA will procure processing equipment including a palm kernel cracker, expeller, and oil squeezer to run on the produced electricity and allow the community to process its agricultural products less expensively and more efficiently.
	Solar Light	2014	\$100,000	Solar: Ghana's informal street vendors often work for less than \$3 a day for long hours in the sun. They are critical to the mobile phone economy by selling the vast majority of phone companies' prepaid "recharge cards," yet the income from phone recharge cards alone is often not enough to sustain a household. Solar Light Company is addressing the problem by prototyping and piloting its "Sunana" solar powered mobile charging system in Accra, Sunyani and Dawhenya. The Sunana unit consists of a solar panel divided into eight segments which can be "worn" on top of a trader's umbrella, and comes with components for charging mobile phones, attaching LED lights, and storing cash. Solar Light Company will build an initial set of prototypes and then deploy the finalized models onto the market, assessing their viability. Solar Light will develop, produce and assemble the units in Ghana.
	Boma Safi Limited	2014	\$100,000	Boma Safi Limited was founded in 2012 to support distribution of renewable energy and energy efficient products to bottom of the pyramid consumers. To date, Boma Safi has signed up 150 savings and credit cooperatives (SACCOs) to distribute cook stoves, and was one of the founding members of the Greening SACCOs initiative, through which it has becoming a leading innovator in access to energy for disadvantaged consumers. Boma Safi registers 10 new SACCOs per month, and each month sells as many as 1,800 solar lanterns and 9,000 cook stoves to end users. Distribution of efficient energy technologies to their customers remains challenging due to their limited buying power. Many households in rural areas are disbursed geographically, increasing transportation costs to reach them. Boma Safi's project proposes to address the problem by utilizing a "hub and spoke" model, in which rural energy hubs aggregate deliveries between the point of sale (typically rural convenience store kiosks), and central hubs. This method will be used to distribute solar lanterns to customers in five regions: Coastal, Lake Victoria, North Rift, South Rift, and Mount Kenya.
	Kitui Industries Limited	2014	\$100,000	Kitui Industries Limited is involved in cotton farming and processing, including the value addition of milling cotton seed into oil and animal feed. Recently it has begun additional processing of cottonseed oil produced into bio-diesel. The organization has invested in a bio-diesel plant that produces bio-diesel which it uses to power its factory and vehicles. This project will expand the existing bio-diesel production plant and expand access to its farmers through inexpensive diesel engines and less expensive diesel fuel. Kitui will produce and sell bio-diesel from cottonseed along with multi-purpose diesel engines. The bio-diesel will be sold to the farmers at a price pegged 15 to 20 percent below the market price for conventional diesel. The company will supply 105 farmers at cost with multi-purpose diesel engines which can be used to power small-scale processing of agricultural production. The project will attempt to spur small scale industries among the farmers of Kitui County by giving them access to reasonably priced green bio-diesel and small scale multi-purpose diesel engines.
	Pfoofy Power and Light Limited	2014	\$100,000	Pfoofy Power and Light Limited is a Kenyan renewable energy company incorporated in 2013. The company has developed the 1 kilowatt "Ecotran" pilot project of a service station for powering electric motorcycles for rural transport. Pfoofy Power and Light addresses the local transportation issues for small farmers by expanding the pilot of its innovative "Ecotran" project. They will establish two 10 kilowatt solar charging stations for 35 electric motorcycles, placed at 10 separate "stages" in convenient locations for customers' access. Pfoofy will train drivers, who will be charged a rental fee for using the motorcycles to provide rides to customers. In addition, Pfoofy will offer daily unlimited battery swapping for customers at a much lower rate than they currently spend on fuel.

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KENYA	SCODE Limited	2014	\$100,000	SCODE Limited is a Kenyan-owned social enterprise registered in 2008. In Nakuru, Uasin Gishu, Embu and Meru counties, as in many other parts of Kenya, the key barrier to access to efficient cooking and lighting technologies is often the high upfront cost of grid connections or outright ownership of a solar home system. SCODE addresses this problem through the project by using a loan fund for pre-financing 75-85% of the total costs of its products to its clients, with repayment periods of 12 months on average. Repayment will be made based on customers' consumption (according to the number of watt-hours used), via mobile money transfer. The product will combine small solar home systems with small forced-draft micro-gasifier stoves.
	Sollatek Kenya	2014	\$100,000	Sollatek Kenya has been in operation since 1985 with offices in Mombasa and Dar es Salaam. They have completed a variety of solar projects all over East Africa with partners including NGOs and international corporations, including solar installations in rural Kenyan and South Sudanese schools. Sollatek addresses the constraints local coastal fishermen are facing by working with already-existing Beach Management Units (BMU) to create and run solar centers to power freezers, phone charging stations, and portable solar lantern rentals to attract fish during night fishing. The company will work with 15 BMUs which meet eligibility criteria, including financial stability and capacity and train them on solar system management, sales, reporting and monitoring, and bookkeeping. They will install the 15 solar centers and transition the ownership of the systems to the BMU's within a two year period.
	Afrisol Energy Limited	2013	\$100,000	Residents of Nairobi's slums lack proper sanitation and toilet facilities. As a result, human waste reaches rivers and waterways polluting the environment and affecting millions of people who depend on the rivers for their livelihoods. Afrisol will address the issue of inadequate sanitation by constructing a bio-digester that converts fecal sludge into electricity. Afrisol will install public pay toilets to collect the necessary feed stock. A bio digester will then convert the feed stock into electricity. The electricity generated will serve as a source of power for the Kwa Njenga Primary School and will provide light for the surrounding area in a radius of 100 meters of the school with a high mask lighting system located in Mukuru kwa Njenga slum. The primary school is currently not connected to any electricity grid.
	Mibawa Suppliers Limited	2013	\$100,000	Low-income rural households in Kenya do not have access to electricity and use kerosene lanterns as their light source. This Project will provide a better and cheaper source of electricity to these low-income rural households in the Meru, Kakamenga, Nandi Hills, and Mgori communities through the distribution of "Indigo" solar lighting kits that also can charge small electronic equipment such as cell phones. Through a pay-as-you-go program, customers will pay an initial deposit followed by very low weekly installment payments allowing the customer to pay for the lights over 80 weeks. With each weekly payment, a customer receives an access code to activate the lighting system for a seven-day period.
	Solar World (East Africa) Limited	2013	\$100,000	Samburu County is a semi-arid county in Kenya. It has a population of 223,000, a majority of whom are pastoralists. Eighty-two percent of the population is rural; access to electricity is estimated to be six percent and the incidence of poverty is estimated to be seventy-three percent. This Project aims to address the current challenges of lack of water and lack of electricity in Samburu County by constructing and equipping five solar powered water points. Each of the five water points will be equipped with a borehole, water storage tank, water vending kiosk, and animal troughs to supply water. In addition, each water point will have an energy kiosk that will provide electrical services including mobile phone and portable LED lantern charging services. The energy kiosk will also be a point of sale for rechargeable LED based lanterns.
LIBERIA	Alternative Energy Inc.	2014	\$100,000	Alternative Energy Inc. is a Liberian-owned business registered in 2004 which specializes in the design/installation of renewable solar energy. Galama Town is an isolated rural area in Lofa County, in the far northwest corner of Liberia, close to the Guinea border and approximately 375 kilometers from Monrovia. The population is estimated at 2,750, none of whom have access to basic energy services. There is no public energy supply and the government and rural electrification authority have no plans to expand their services there. The villagers depend on towns at least 25 miles away to purchase kerosene for homemade lamps and dry cell batteries. The project addresses the current challenges by installing mini off-grid solar systems for 90 households, 5 classrooms in 1 school, 1 clinic/drugstore, 11 shops, and 5 streetlights. Usage fees will be charged to households and shops and at a subsidized rate to the school & clinic.

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<div>LIBERIA</div>	Ecovillage Community Improvement Association, Inc.	2014	\$100,000	Ecovillage Community Improvement Association, Inc. has been created to represent the interests of homeowners and residents of Ecovillage Schieffelin residential community with 80% of the shares reserved for future homeowners. This project will deploy a 50kW off-grid solar power network. The system will include DC to AC inverters and a distribution network including direct connections for households and businesses within 1 kilometer radius, and 2 small kiosks for affordable pay-as-you-go battery charging for cellphones and LED household lighting fixtures. Businesses and households with a direct connection will pay a small monthly fee. In addition, discounted power will be provided for schools and security lighting.
	Liberia Engineering and Geo-Tech Consultants Company	2014	\$100,000	Liberia Engineering and Geo-Tech Consultants Company is a Liberian owned company comprising of a group of trained Liberian general construction engineers, architects and electricians. Liberia Engineering & Geo-Tech Consultants Company is currently providing electricity at a small scale to 13 households using a fuel based generator in the town of Totota, central Bong County. This project expands these activities by constructing a stand-alone PV 25 KW solar plant to serve 50 households through a minigrid. Households will pay small monthly fee based on metered usage of electricity.
	GVE Projects Limited	2013	\$100,000	Egbeke community is located in Etche Local Government Area, Rivers State, Nigeria. Currently, the community benefits from a 6 kilowatt (kW) solar electricity pilot project implemented by GVE Projects Ltd that is providing electricity to 90 homes out of 300 in the community. The remaining 210 homes are currently without any electricity. GVE Projects Ltd proposes to expand on the pilot project by providing electricity to an additional 140 homes in the community. Sixty homes will receive electricity by a direct connection to the solar electricity system and an additional eighty homes that are far from the electricity grid will receive electricity by portable battery home kits.
<div>NIGERIA</div>	Afe Babalola University (ABUAD)	2013	\$100,000	Due to the intermittent and limited electricity supply from the national grid, ABUAD of Ado-Ekiti has had to generate its own power using diesel powered generators. As a solution to this problem, the university proposes to construct a renewable hydropower plant. The benefits of the hydropower plant will go to the university community and neighboring community settlement with a population of over 10,000. In order to construct a hydropower plant, ABUAD must first complete a feasibility study, a detailed project report and an environmental impact assessment.
	Trans Africa Gas and Electric	2013	\$100,000	Farmers in the Urban Frontier Mission of Jos, Nigeria currently lack cold storage for their agricultural produce. As a result, produce is often subject to spoilage or is sold at below market prices. This project proposes to construct a standalone cold storage facility for the preservation of all types of vegetables, fish and poultry. In addition, the facility will be equipped with ice making. The facility will be powered by an 8 kilowatt (kW) solar photovoltaic system. Farmers will then pay a small fee to warehouse their products and will purchase ice to preserve daily produce.
	Ginphed Nigeria Limited	2014	\$100,000	Ginphed Nigeria Limited is a private company incorporated in 2003. In the region near Ginphed Farm in Cross River State, the majority of inhabitants base their livelihoods on production of agricultural products, which require processing prior to sale or else significant amounts are lost to post-harvest spoilage. Many farmers rely on cottage industry processing for their farm produce, but electricity from the national grid is unreliable and much processing is fueled either by firewood or by expensive diesel-powered generators, which cuts significantly into profit margins. Ginphed is addressing these issues by constructing a bio-digester to convert animal manure into biogas to be used for electricity generation, which would be sold to farms and agro-processing cottage industries in the surrounding communities.
	Quintas Renewable Energy Solutions	2014	\$100,000	Quintas Renewable Energy Solutions is a Nigerian-owned limited liability company which specializes in technology development including solar and biomass generation and farm-gate industrial cluster development. The community of Ofosu, located in Ondo State, does not have access to grid electricity, but has a strong local farming industry. Currently, agricultural products are mainly processed using manual processing methods which are taxing for farmers and inefficient. If farmers are able to process more of their agricultural and forest produce beyond the primary raw material stage before sales, they will be able to enhance their income. Quintas is addressing these constraints by developing a 500 kilowatt biomass power plant which will take advantage of the community's agricultural and forestry residue, including sawdust from the four sawmills in the area, which have an abundance of sawdust and currently rely on expensive diesel to power their mills. The power plant will include a steam turbine, generator, and gasifier with combustor. The electricity will be paid for through pre-paid meters.

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NIGERIA	Sky Resources	2014	\$100,000	Sky Resources is a Nigerian-owned private company focused on promoting renewable energy technologies. Nawgu, a community in Anambra State, is one of thousands of villages in Nigeria with no grid access to electricity and grid extension is unlikely for some time. The village has a small but thriving small and medium enterprise community which currently relies on costly and unreliable diesel for much of its energy needs, which significantly increases enterprise operating costs. Sky Resources is addressing these constraints by developing a small solar micro-grid for which users will pay on a per-use basis. They will be supplying electricity for up to 75 small and micro businesses.
	Topstep Nigeria	2014	\$100,000	Topstep Nigeria is an energy solutions provider with a focus on renewable energy and energy conservation. Babban Gona Agricultural Franchise is a 2,000 member strong farmer cooperative located in the Makarfi and Ikara Local Government Areas of Kaduna State. In order for the member farmers to increase their income, they need to increase market value of their produce by adding value to their produce through post-harvest processing. Currently, they do not have access to reliable electricity. Topstep successfully installed and operated a solar maize mill in 2012, but it is severely undersized to current demand. Topstep is addressing this constraint by expanding the current solar maize mill processing station that has been previously installed. The project is expanding the existing processing capacity to 1,400 metric tons of maize per year by installing 5 processing stations located near the farmer's fields. Each station will have 3 high quality milling machines powered by solar energy as well as portable batteries charged and available for farmers to use at their homes for a fee.
TANZANIA	Jamii Power Limited	2014	\$100,000	Jamii Power Limited was legally registered in Tanzania in 2012. The purpose of the USADF grant is to improve quality of life for rural Tanzanians by expanding an existing 11 kW solar PV-based mini-grid in Masurura. This project will enable greater access to electricity within the community and simultaneously provide an adequate (33 kW) mini-grid platform for the prototyping and deployment of smart metering and grid management system that Jamii Power is currently developing.
	L's Solution Limited	2014	\$100,000	L's Solution LTD is a 100% Tanzanian-owned social enterprise based in Arusha, Tanzania that was legally registered in Tanzania in 2007. The purpose of the USADF grant is to build a solar PV powered mini-grid that will provide first time access to electricity to residents in Samunge village, which falls within the border of Ngorongoro National Park and is about 60 km from the national grid. L's Solution will install and operate a 12 kW solar PV power plant that will supply electricity to 120 households, 10 businesses, 3 health centers, and 4 schools in Samunge village in the Loliondo district of the Arusha region of Tanzania.
	Lung'ali Natural Resources Company (LNRC) Limited	2014	\$100,000	LNRC is a Tanzanian company currently developing the Maguta - Small Hydro Electricity Power Project (SHEPP). The purpose of the USADF grant is to support Lung'ali to provide households in off-grid village communities with first-time access to modern electricity services. With support from an NGO based in Bologna, Italy, the organization has developed a 2.4 MW dam serving 16 villages covering 3,500 households in Kilolo administrative district. The project civil works is 95% complete and the electro-mechanical equipment (turbine, generator transformer etc.) is 98% complete. The Maguta SHEPP is located at Kilolo district in the Iringa region. Lung'ali Natural Resources Company will benefit from USADF support by installing electricity service connections to end users in six villages of Madege, Idegenda, Isanga, Nging'ula, Ilutila and Masisi. Phase I will serve 2,436 households, 4 health centers, 8 schools, 26 churches and mosques, 32 grain mills, 25 shops and public lighting. Electricity consumers will be charged using mobile prepaid-metering and it is expected that with the introduction of modern electricity, energy expenditures of area residents will fall below 50% of the current average.
	Space Engineering	2014	\$100,000	Space Engineering is a small private company that was legally registered and incorporated in Tanzanian in 1991. The project area is the remote Ward of Itaka in Mbozi district in Mbeya. The proposed project targets 3 cluster villages in Itaka whose total population is 592 households without access to national grid electricity. They have 2 diesel generators producing electricity for local businesses, also 3 diesel engines running machines for maize milling and coffee deshelling. The purpose of the USADF grant is to improve quality of life in rural Mbozi district by generating 40 kW of electricity using a hybrid solar-biomass power plant. This electricity will then be distributed through a mini-grid to 592 households, 2 schools, 1 health center and 9 local businesses that support maize and coffee agro businesses.